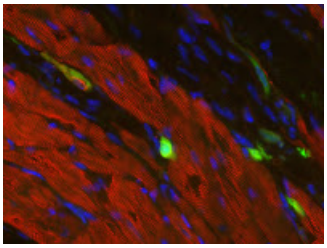
# Fibroblasts reprogrammed to heart cells

Posted: August 5, 2010

**Created:** 05/08/2010 - 09:18



Cardiac muscle (red) with reprogrammed fibroblasts (green). Srivastava lab.

The dogma was once that mature cell types like skin or nerves needed to be reprogrammed to an embryonic-like state before they could mature into a different cell type. Essentially, if a cell was a doctor it would need to go back to kindergarden before it could grow up to become a lawyer.

That was until last year when Doug Melton and his team at the Harvard Stem Cell Institute did the equivalent of sending the cellular doctors directly to law school. They succeeded in converting one type of mouse pancreatic cell directly into the pancreatic beta cells that produce insulin. Earlier this year, Stanford scientist Marius Wernig carried out a similar feat, turning skin cells into nerve cells.

Now another CIRM grantee - this time Deepak Srivastava at the Gladstone Institute of Cardiovascular Disease and UCSF - has bypassed the embryonic state. He reprogrammed mouse fibroblasts directly into primitive heart cells. In a press release, Srivastava said:

> "The ability to reprogram fibroblasts into cardiomyocytes has many therapeutic implications. Half of the cells in the heart are fibroblasts, so the ability to call upon this reservoir of cells already in the organ to become beating heart cells has tremendous promise for cardiac regeneration."

This work builds on work by another Gladstone scientist. Shinya Yamanaka was the first to reprogram adult cells to an embryonic state called induced pluripotent stem (iPS) cells. What Srivastava, Wernig and Melton have shown is that this initial reprogramming step may not always be needed to create therapeutic cell types. Avoiding the embryonic state may avoid the tumor-causing potential of embryonic cells and may have other advantages, according to the Gladstone release. However, Srivastava points out that this cellular career switch has yet to succeed in human cells.

Cell, August 5, 2010

CIRM Funding: Deepak Srivastava (RC1-00142-1), Benoit Bruneau (RN2-00903-1)

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**Tags:** Srivastata, Heart Disease, Gladstone Institute, Bruneau